

# Clinical and onychoscopic evaluation of nail changes in psoriasis at a tertiary-care hospital: A cross-sectional study

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## ABSTRACT

**Background:** Up to 30–50% of cases of psoriasis experience nail involvement, while 5–10% may have only isolated nail disease. Recently, the use of onychoscopy, a non-invasive technology, has emerged as a promising tool that may eliminate the necessity of a nail biopsy in most cases. **Objective:** The objective of this study was to assess the onychoscopic characteristics of the nail unit in individuals with nail psoriasis. **Materials and Methods:** The study recruited fifty patients with a clinical diagnosis of nail psoriasis. Each nail underwent onychoscopic assessment. The clinical degree of cutaneous and nail involvement was evaluated with the Psoriasis Area and Severity Index (PASI) and the Nail Psoriasis Severity Index (NAPSI), respectively. **Results:** The following findings were observed significantly more often on onychoscopy than with the naked eye: pitting ( $p = 0.03$ ), leukonychia ( $p = 0.04$ ), onycholysis ( $p = 0.04$ ), and splintered hemorrhage ( $p = 0.05$ ). The other novel findings included fuzzy lunula, which was only onychoscopically (8%), We also encountered 4% of cases of triangular onychomadesis and 6% of non-traumatic Median canaliform dystrophy of Heller. **Conclusion:** Our findings suggest that, even before clinical symptoms become obvious, onychoscopy may help with nail lesion diagnosis.

**Key words:** Onychoscopy; Nail Psoriasis; Psoriasis; Nail Pitting; Fuzzy Lunula; Triangular Onychomadesis

## INTRODUCTION

Psoriasis is a chronic, papulosquamous disorder with an immune-mediated pathogenesis. The disease may involve not only the skin, yet also the nails and mucosa. The prevalence of psoriasis varies over the world, affecting between 0.5% and 2.5% of the global population [1,2]. In around 30–50% of cases, nail affliction is observed, with a lifetime prevalence between 80% and 90%. Nail involvement is widely prevalent in psoriatic arthropathy (PsA) and severe plaque psoriasis [3,4]. In fact, 5–10% of psoriatic individuals typically have isolated nail disease [5,6].

It is fairly simple to detect nail psoriasis when skin lesions are present. Although, due to its resemblance to other causes of dystrophic nails, including onychomycosis,

lichen planus pityriasis rubra pilaris, alopecia areata, and traumatic onycholysis, there is a diagnostic conundrum in cases with solitary nail involvement [7]. Despite the high specificity of nail biopsies in diagnosing nail diseases, they have a low sensitivity and may proficiently diagnose nail psoriasis in only 50% of cases [3,8].

Dermoscopy is a quick, non-invasive, and *in vivo* technique with proven diagnostic value for pigmented skin and nail abnormalities. Dermoscopy is also one of the most effective methods for spotting early nail involvement. This property may eliminate the need for histopathological analysis in nail psoriasis diagnosis and treatment follow-up.

To date, only a handful of authors have attempted to examine the dermoscopic characteristics of nail

**How to cite this article:** Khokhar R, Dutt Mehta R, Chand Ghiya B, Soni P, Dhaka C, Kumar Yadav M, Jangir V, Arora A, Pareek S, Mohta A. Clinical and onychoscopic evaluation of nail changes in psoriasis at a tertiary-care hospital: A cross-sectional study. *Our Dermatol Online*. 2023;14(3):274-279.

**Submission:** 09.01.2023; **Acceptance:** 29.04.2023

**DOI:** 10.7241/ourd.20233.7

psoriasis [9-12]. In this study, we intended to assess the value of onychoscopy in nail psoriasis. Our primary objective was to observe the onychoscopic findings in the nails of the psoriatic patient. The secondary objectives included assessing the prognostic significance of subclinical nail changes visualized on the onychoscope and correlating the severity of the disease with onychoscopic findings.

## MATERIALS AND METHODS

This prospective and observational study was conducted at outpatient and inpatient dermatology departments over the course of one year after obtaining due approval from the institutional ethics committee (F.29.(Acad)SPMC/2021/3014). All participants gave written informed consent to be a part of the study. The study population included patients with a clinical diagnosis of psoriasis. In clinically ambiguous cases, histopathological analysis was performed to confirm the diagnosis. Only those cases who had psoriasis with nail lesions or isolated nail psoriasis were enrolled. Patients with a significant systemic illness or another concurrent dermatological or cutaneous disease were excluded. A thorough medical history was taken, and general physical examination and systemic and joint examinations were performed.

In addition to clinical and onychoscopic examinations, photographic documentation was completed on all 20 nails (10 fingers and 10 toenails) with a handheld dermatoscope (DermLite, 3<sup>rd</sup> generation; magnification: 10×) under the supervision of a senior faculty. Digital photographs were taken with a mobile camera with the same settings. The images were examined on the computer screen and, after thorough image analysis, onychoscopic findings were interpreted and noted.

Calculating the mean and standard deviations for the continuous variables served as descriptive statistics. Categorical variables were displayed as percentages and absolute numbers. In order to compare nominal categorical data between the groups, the chi-squared goodness-of-fit test was employed. The Pearson correlation coefficient was employed to calculate the correlation between the different variables.

Considering the prevalence of psoriasis in India at 2.8%, a clinical involvement of the nails in 60% of cases, a confidence level of 50%, and a 5% margin of error, a sample size of 31 was calculated [13,14].

However, we increased the sample size to 50 in view of potential subclinical nail involvement visualizable on the onychoscope.

Data was entered, checked, and analyzed with SPSS 22.0. The chi-squared test and Z scores were calculated wherever necessary. A *p* value < 0.05 was considered statistically significant.

The clinical degree of cutaneous and nail involvement was evaluated with the PASI and NAPSI, respectively.

## RESULTS

In our study, a total of fifty patients with psoriasis were included, ranging from 14 years to 71 years. The majority of the psoriatic patients were between 20–29 years of age (26%), with a male-to-female ratio of 1.78:1. The mean age of our study subjects was  $39.66 \pm 19.06$  years. The demographic data of the patients was tabulated in Table 1. In this study, 64% of the patients were diagnosed with chronic plaque psoriasis (CPP), followed by 14% of cases with palmoplantar psoriasis (PPP), 10% of cases with erythrodermic psoriasis (EP), 6% of cases with nail psoriasis (NP), 4% of cases with guttate psoriasis (GP), and 2% of cases with inverse psoriasis (IP).

Clinically, a majority of the cases had the involvement of  $\leq 5$  nails (38%), followed by the involvement of 6–10 nails (30%), and of 11–15 nails (26%). The average number of nails involved per case was 7.8 nails. Similarly, onychoscopically, a majority of the cases had the involvement of  $\leq 5$  nails (38%), followed by the involvement of 6–10 nails (30%), and of 11–15 nails (20%). The onychoscope had a higher proficiency in detecting a higher number of nails, yet the difference was statistically insignificant (0.71) (Table 2).

**Table 1:** Clinical and epidemiological data of the study participants

Parameter	Value
Mean age	39.66±19.06 yrs.
<b>Sex</b>	<b>Number of patients (%)</b>
Male	32 (64%)
Female	18 (36%)
Male-to-female ratio	1.78:1
<b>Clinical diagnosis</b>	<b>Number of patients (%)</b>
Chronic plaque psoriasis (CPP)	32 (64%)
Palmoplantar psoriasis (PPP)	7 (14%)
Erythrodermic psoriasis (EP)	5 (10%)
Nail psoriasis (NP)	3 (6%)
Guttate psoriasis (GP)	2 (4%)
Inverse psoriasis (IP)	1 (2%)

A majority of the patients ( $n = 28$ ; 56%) had NAPSI scores ranging from 0 to 20, followed by 14% with scores of 21–40, 10% with scores of 41–60, 10% with scores of 61–80, 6% with scores of 81–100, and 4% with scores of 101–120.

In our study, the following nail matrix findings were seen: 68% had pitted nails, 44% had leukonychia, 48% had crumbling, 8% had onychomadesis, 8% had fuzzy lunula, 6% had median canaliform dystrophy, and 6% had trachyonychia. However, onychoscopically, a greater number of patients had nail matrix findings. Significant  $p$ -value results were found with the chi-squared test for pitting ( $p = 0.03$ ) and leukonychia ( $p = 0.04$ ), with onychoscopy being superior to clinical examination for the identification of these nail matrix findings (Table 3).

The following nail bed findings were seen clinically: 54% had onycholysis, 42% had SUHK, 20% had splinter hemorrhage (Figs. 1a and 1b), and 14% had oil drop signs (Figs. 1c, 1d, 2a, and 2b). On onychoscopy, significant  $p$ -value results were found with the chi-squared test for onycholysis ( $p = 0.04$ ) and splinter hemorrhage ( $p = 0.05$ ), with onychoscopy being superior to clinical examination for the identification of these nail bed findings (Table 4).

Overall, the mean NAPSI of the patients was 31.46. There was a strong positive correlation between NAPSI and duration of psoriasis. The correlation coefficient was 0.82, and the  $p$  value was  $< 0.0001$  (highly significant correlation). There was also a moderate correlation between NAPSI and PASI. The correlation coefficient was 0.67, and the  $p$  value was  $< 0.0001$  (highly significant correlation).

## DISCUSSION

In our study, the mean age of the study subjects was  $39.66 \pm 19.06$  years (ranging from 18 to 79 years), which was comparable to similar studies conducted across the globe. A study by Yadav et al. reported a mean age of 38.36 years [10]. Similar results were reported by Wanniang et al. (45.02 years) and Daulatabad et al. (36.3 years) [9,14], together with studies by van der Velden et al. (48 years), Marina et al. (51.89 years), Brazzelli et al. (52.53 years), and Hashimoto et al. (47.5 years) [15–18]. There was also a male preponderance in this study, with a male-to-female ratio of 1.78:1. Fairly similar results were reported by Chauhan et al., Hashimoto et al., and Yadav et al. [3,10,18].

**Table 2:** Number of nails involved clinically vs. dermatoscopically

Number of nails involved	Clinically	Percentage	Onychoscopically	Percentage	$p$ value*
$\leq 5$	19	38%	19	38%	0.71
6–10	15	30%	15	30%	
11–15	13	26%	10	20%	
16–20	3	6%	6	12%	
Total	50	100%	50	100%	

\*Chi-squared test

**Table 3:** Nail matrix in clinical vs. onychoscopic findings

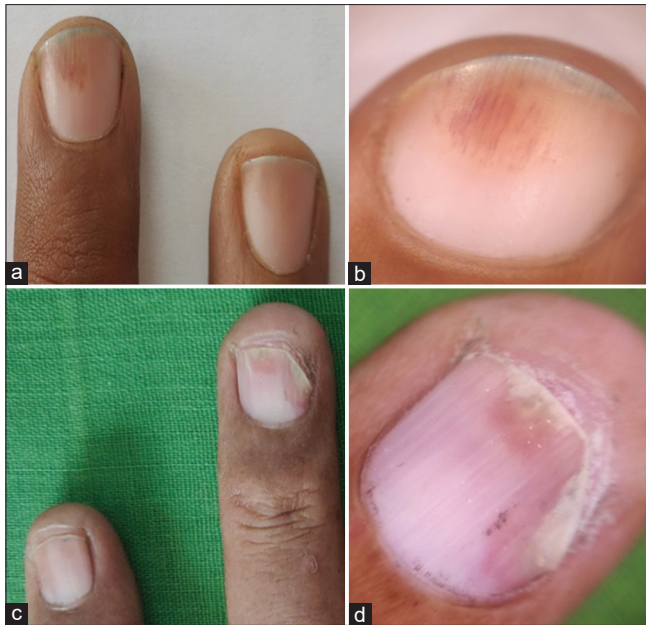
Nail Matrix findings	Clinically		Onychoscopically		$p$ value*
	Clinically	Percentage	Number of patients	Percentage	
Pitting	34	68%	43	86%	0.03
Leukonychia	22	44%	32	64%	0.04
Crumbling	24	48%	24	48%	-
Onychomadesis	4	8%	4	8%	-
Fuzzy lunula	0	0%	4	8%	-
Median canaliform dystrophy	3	6%	3	6%	-
Trachyonychia	3	6%	6	12%	0.29

\*Chi-square test

**Table 4:** Nail bed in clinical vs. onychoscopic findings

Nail Bed findings	Clinically		Onychoscopically		$p$ value*
	Clinically	Percentage	Number of patients	Percentage	
Onycholysis	25	50%	35	70%	0.04
Subungual hyperkeratosis	21	42%	21	42%	-
Splinter hemorrhage	10	20%	19	38%	0.05
Oil drop sign	7	14%	13	26%	0.13

\*Chi-squared test



**Figure 1:** (a) Clinical image of splinter hemorrhage. (b) Dermatoscopic image of splinter hemorrhage with tortuous blood vessels and a diffuse, orangish-yellow background. (c) Clinical image of the oil drop sign. (d) Dermatoscopic image of the oil drop sign with leukonychia and a disrupted, onychocorenal band.



**Figure 2:** (a) Clinical image of subungual hyperkeratosis (SUHK). (b) Onychoscopic image of SUHK with white, superficial scales. (c) Clinical image of nail pitting. (d) Onychoscopic image showing coarse and deep nail pitting in a haphazard arrangement, nail plate scales, and onycholysis.

In our study, the most common nail finding was pitting (Figs. 2c and 2d), followed by onycholysis and crumbling. These results were consistent with previously conducted

research [3,9,14]. However, red lunula, a relatively uncommon nail finding in psoriatic patients, was not observed in any of our cases. Our subjects' mean PASI score was  $8.93 \pm 5.04$  (0–33), which was comparable to that observed by Chauhan et al. However, Wanniang et al., Brazzelli et al., Schons et al., and Daulatabad et al. observed a higher mean PASI [9,14,17,19]. The mean NAPS I was 31.46, which was comparable to similar studies [14,19,20]. NAPS I was also comparable in individuals with associated arthritis, and scores were greater in the fingernails than the toenails.

In this study, we also found a positive correlation between NAPS I and PASI scores, as well as between NAPS I and disease duration. This data was a strong indicator that nail involvement becomes more pronounced with increasing disease duration and severity. Although Rich et al. reported no significant correlation between NAPS I and PASI, both Chauhan et al. and Patsatsi et al. detected a significant correlation [3,21,22]. This was attributed to the fact that, while Chauhan et al. assessed the total NAPS I (0–160) the way that we did, Rich et al. used only the target NAPS I (0–8) [3,21]. As far as the correlation between disease duration and NAPS I was concerned, Daulatabad et al. found a significant correlation between the two variables. Wanniang et al. also reported a significantly positive correlation between dermatoscopic NAPS I and PASI scores [9,14].

On onychoscopic evaluation, pitting was the most common nail matrix finding, observed in 43 (86%) cases. There was a significantly higher prevalence of pitting on onychoscopy than clinically ( $p = 0.03$ ). This finding was in agreement with observations made by Chauhan et al. Yadav et al., Yorulmaz et al., and Wanniang et al. [3,9,10,12].

Other findings, such as leukonychia ( $p = 0.04$ ), onycholysis ( $p = 0.05$ ), and splinter hemorrhage ( $p = 0.04$ ), were also significantly higher on onychoscopy. Other onychoscopic findings of the nail matrix and nail bed findings were comparable to the naked eye examination.

Leukonychia and nail plate crumbling were the two most common nail findings, observed at a significantly higher rate on onychoscopy than clinically. These findings were also reported by Wanniang et al. and Yorulmaz et al [9,12].

A novel finding of this study was fuzzy lunula (Fig. 3a), which was observed only onychoscopically. Fuzzy lunula



**Figure 3:** (a) Onychoscopic image showing fuzzy lunula. (b) Triangular proximal nail plate dystrophy with nail plate scales and cuticular destruction. (c) Medial canalicular dystrophy. (d) Leukonychia.

was seen in 4 (8%) cases. Fairly unprecedented in the literature, fuzzy lunula was a unique finding in this study, which had previously been reported only once, by Chauhan et al. [3]. Onychoscopically, the nail lesion appeared as a wide and crooked, white lunula.

We also encountered two cases of triangular onychomadesis and three of non-traumatic median canaliform dystrophy of Heller (Figs. 3b – 3d). To date, these findings have not been reported by any other study.

Our study was limited by a small sample size, a short study duration, and the absence of histopathological or radiological correlation. Additionally, the impact of the treatment on nail findings was not assessed.

## CONCLUSION

In conclusion, the nails are indeed a window to the underlying disorders of the body [23,24]. Dermoscopy serves as a bridge between histological and clinical examinations and aids in the identification of nail psoriasis well before the clinical indications of nail involvement are obvious. A possible early indicator of disease activity is the appearance of dermoscopic characteristics in apparently healthy nails. In patients with nail psoriasis, this study

thoroughly detailed the dermoscopic characteristics of the nail matrix and nail bed. However, further controlled investigations need to be conducted on a larger sample size in order to proficiently determine the sensitivity and specificity of all dermoscopic features in order to standardize their diagnostic value.

## Statement of Human and Animal Rights

All the procedures followed were in accordance with the ethical standards of the responsible committee on human experimentation (institutional and national) and with the 2008 revision of the Declaration of Helsinki of 1975.

## Statement of Informed Consent

Informed consent for participation in this study was obtained from all patients.

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**Source of Support:** This article has no funding source.  
**Conflict of Interest:** The authors have no conflict of interest to declare.